



CANADA-ONTARIO AGREEMENT RESPECTING THE GREAT LAKES BASIN ECOSYSTEM 2004-2005 BIENNIAL PROGRESS REPORT

Introduction

The 2002 Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA) commits both levels of government to work together and with other groups and individuals to achieve the vision of a healthy, prosperous and sustainable Great Lakes Basin ecosystem for present and future generations. With a five-year term, the 2002 COA is the latest in a series of federal-provincial agreements to improve environmental quality in the basin, dating back to 1971.

Under the 2002 agreement, Progress Reports are issued every two years. This is the second biennial Progress Report.

Building upon the information provided in the 2002-2003 report, this publication provides an update on the progress toward each COA goal and highlights examples of the important work undertaken in 2004 and 2005 to achieve planned results. This report also describes key challenges that must still be overcome.

Working Together for the Lakes

The Governments of Canada and Ontario cooperate on Great Lakes restoration and protection through the COA. This coordinated effort plays a significant role in meeting Canada's commitments under the Canada-U.S. Great Lakes Water Quality Agreement.

The COA's success to date could not have been accomplished without the support of local and regional governments, industry, communities, Aboriginal peoples and environmental groups. Everyone who lives, does business or vacations in the Great Lakes Basin has a role to play in restoring and protecting the ecosystem.

The Agreement ensures that federal and provincial government programs are well coordinated and responsive as they assist projects of numerous partners. The binational aspects of many of these programs help to harmonize the Great Lakes restoration and protection effort on both sides of the border.

A report of this length cannot list all the activities undertaken by the parties to the Agreement or their partners. Links to further information are included in each section of the report.

The COA Agencies

The signatories to the COA are the federal Ministers of the Environment, Agriculture and Agri-Food, Fisheries and Oceans, Health, Heritage (Parks Canada), Natural Resources, Public Works and Government Services, and Transport; and the provincial Ministers of the Environment, Agriculture, Food and Rural Affairs and Natural Resources. Their respective departments and ministries are called the COA agencies.

Four Annexes

The COA calls for the parties to develop and implement Annexes to the Agreement that focus on priority environmental issues or aspects of environmental management. It is through these Annexes that the COA vision is to be achieved. Each Annex sets five-year goals, establishes intended results and indicates how each party will contribute to achieving them.

Four Annexes are in place:

- | | |
|------------------------|--|
| 1. Areas of Concern | 2. Harmful Pollutants |
| 3. Lakewide Management | 4. Monitoring and Information Management |

This report reviews progress and activities under each annex in 2004 and 2005.



Annex 1

AREAS OF CONCERN (AOC)

Overview

Areas of Concern (AOCs) are locations where environmental quality is significantly degraded, resulting in the impairment of beneficial uses for humans or wildlife. Beneficial use means the ability of living organisms to use the ecosystem without adverse consequence. Beneficial use impairments (BUIs) range from fish deformities to beach closings to taste or odour problems with drinking water.

Currently, 15 AOCs have been designated in the Canadian portion of the Great Lakes. Five of these AOCs are shared with the United States.

The 15 AOCs are:

Thunder Bay	Spanish Harbour	Hamilton Harbour
Nipigon Bay	St. Clair River	Toronto and Region
Jackfish Bay	Detroit River	Port Hope
Peninsula Harbour	Wheatley Harbour	Bay of Quinte
St. Marys River	Niagara River	St. Lawrence River (Cornwall)

Canadian Areas of Concern



Purpose of Annex

This Annex focuses on initiatives by the Governments of Canada and Ontario to restore and protect environmental quality and beneficial uses in the 15 AOCs. Remedial Action Plans (RAPs) are being implemented in each AOC to guide restoration and protection efforts.

RAPs outline the actions necessary to address issues in each AOC and ultimately restore the local ecosystem, so the area can be removed from the AOCs list. This process has three stages:

- Stage 1 Report – Identification and assessment of problems in the AOC.
- Stage 2 Report – Determining actions required to restore beneficial uses.
- Stage 3 Report – Completion of remedial measures and monitoring of data to confirm environmental recovery.

An AOC is delisted when evidence confirms that RAP goals have been met. An AOC is considered an Area in Recovery when all required actions have been completed, but time is still needed for the ecosystem to fully respond to the remediation measures.

Progress on Goals

Goal 1

Restoring environmental quality and beneficial uses in at least two locations, resulting in the removal of the "Area of Concern" designation.

Progress

In 2004 and 2005, COA agencies made progress towards restoring environmental quality and beneficial uses in the AOCs with the most potential for achieving delisted status in the current COA timeframe.

In the Nipigon Bay AOC, upgrades of the sewage treatment plants for the Towns of Nipigon and Red Rock are required actions in the Stage 2 RAP Report. Nipigon began its upgrade in April 2005 with federal and provincial funds, while funding for the Red Rock upgrade is still being considered. Neither upgrading project is likely to be completed by March 2007, when the COA expires. Monitoring of beneficial uses is continuing to determine when the Nipigon Bay area has recovered to a level that justifies delisting it as an AOC. This monitoring will extend beyond the end of the Agreement.

All required actions within the Spanish Harbour AOC were completed in 1999 and natural recovery of the sediment is continuing. Muskies have been successfully reintroduced in the river and monitoring of sediment and fisheries is ongoing.

Severn Sound was officially removed from the list of AOCs in 2003.

Goal 2

Completing all required actions for the Remedial Action Plan in at least six Areas of Concern (and continuing to monitor recovery towards removing the AOC designation in each).

Progress

Wheatley Harbour is well on its way to completing all required actions for its RAP by the March 2007 target date. While a number of other AOCs are approaching this objective, the goal of having six AOCs complete all steps by March 2007 will not be met. Funding and support for municipal infrastructure improvements and the management of contaminated sediment are the main obstacles to overcome in the other AOC candidates for this goal: Nipigon Bay (as outlined in Goal 1), the St. Lawrence River, Thunder Bay, Bay of Quinte, Peninsula Harbour and Jackfish Bay.

In the St. Lawrence AOC, upgrading the Cornwall sewage treatment plant has been recommended. The City of Cornwall is pursuing funding options, in consultation with the federal and provincial governments. If funding is secured, construction will begin after March 2007.

The Thunder Bay AOC has one outstanding activity in its RAP, the remediation of sediment in the north harbour. The assessment of sediment contamination was scheduled to be completed in early 2006. The next step, a sediment management strategy, is expected to be finalized after March 2007.

The Bay of Quinte faces new challenges not identified at the beginning of the COA. Updated models have determined that the previous phosphorus loading targets were too high and new targets have been set. Additional monitoring in 2004 found an area of sediment contamination in the mouth of the Trent River. The RAP committee is now developing an updated phosphorus management strategy and assessing the ecological and human health risks posed by the contaminated sediment. This essential work will continue beyond the COA timeframe.

All actions within the Peninsula Harbour AOC have been completed except for the development of a sediment management strategy. Canada and Ontario, along with local community partners, will complete an evaluation of sediment management options by March 2007.

In the Jackfish Bay AOC, efforts are underway to determine what additional monitoring and assessment work is needed.

Making progress towards rehabilitation of ecological systems in the remaining Areas of Concern.

Goal 3

Progress

In 2004 and 2005, progress continued towards the rehabilitation of ecological systems in the St. Marys River, St. Clair River, Detroit River, Niagara River, Hamilton Harbour, Toronto and Port Hope AOCs.



COA IN ACTION

Community/Partner Empowerment

Across the Great Lakes, community-based groups play a major role in the implementation of RAPs. They undertake local projects that further RAP goals as well as monitoring progress and communicating with the public. These community-based partnerships include local citizens, industry, government, academics and environmental organizations – all working together in a spirit of stewardship for the basin ecosystem.

Examples of these groups include:

- Detroit River Canadian Cleanup Implementation Committee
- Bay Area Restoration Council (BARC) in Hamilton
- St. Marys River Binational Public Advisory Council
- St. Lawrence River Restoration Council.

Environmentally Sustainable Farmers Improving Our Water Quality

In 2004 and 2005, farmers continued to participate voluntarily in the Environmental Farm Planning (EFP) process. Farmers in AOCs across Ontario – including St. Lawrence River, Bay of Quinte, Port Hope Harbour, Hamilton Harbour, St. Clair River and Detroit River – have adopted sustainable practices that will make a solid contribution to the protection and improvement of Great Lakes water quality. Between 1993 and 2004, more than 27,000 (or 45%) of Ontario farmers participated in the EFP process.

The current EFP educational and cost-sharing programs provide 30% to 50% funding for farm improvements under the Agricultural Policy Framework (APF). The APF is an agreement between the federal and provincial governments to make Canada's agricultural sector a world leader in environmentally sustainable production.

Through COA agencies and other government programs and partners, farmers in selected areas can now receive funding for such steps as:

- controlling farmyard runoff;
- revitalizing and protecting streams and rivers on farms;
- preventing damage to wildlife; and
- making barn improvements that reduce water use.

These actions help improve and protect water quality and natural habitats in the Great Lakes Basin.

Sediment Assessment Framework

A longstanding issue, contaminated sediment is a significant factor in degraded environmental conditions and BUIs in several AOCs. Evaluation of the environmental risk posed by contaminated sediment and the development of management options represent major challenges.

A harmonized federal-provincial approach to contaminated sediment is essential for consistent assessments and transparent decision-making. To address this issue, the COA commits both governments to work together to develop a risk-based, decision-making framework for contaminated sediment in the AOCs. Building on decades of experience, COA agencies made great strides in 2004 and 2005, with invaluable input from Canadian and international experts. The decision-making framework will facilitate scientific consensus and pave the way for the management of contaminated sediment.

Bringing Muskie Back to Spanish Harbour

Although Spanish Harbour is considered an Area in Recovery, efforts are still being made to improve the ecosystem there. For example, in 2004 biologists began assessing the number, age and genetic origins of local muskie to gauge the long-term success of the stocking program in place since 1996. Preliminary results are encouraging, as the presence of young fish confirms that natural reproduction is taking place.

Getting Results through Improved Sewage Treatment Facilities

Research on Hamilton Harbour's nutrient loading problem indicates that the harbour has responded favourably to improvements at the Halton Region Skyway sewage plant. Some of the best water quality ever recorded occurred in 2005 despite a very hot summer. These results coincide with more efficient operation of the Skyway facility, Hamilton's largest sewage plant, and provide further momentum for infrastructure renewal funded by all levels of government.

ANNEX CHALLENGE

Two of the major challenges facing Areas of Concern are sediment contamination and outdated municipal infrastructure.

Sediment spoiled by decades of pollution can raise serious human and environmental health concerns. It can be toxic to organisms that live in or on it, and may pose a threat to other organisms in the food chain, including fish, wildlife and humans. Reaching consensus and making decisions on the need for sediment remediation, and then undertaking projects to make it happen, are complex undertakings. These efforts involve government, industry and community stakeholders and can take years to complete.

During 2004 and 2005, the federal, provincial and municipal governments invested \$500 million to improve sewage treatment and stormwater control and reduce sewer overflows in the basin. The goal: to curtail pollution entering the Great Lakes from municipal sources. Despite this investment, sustained long-term efforts will be necessary to both modernize aging sewer and water systems and develop new systems to keep pace with urban development.

Moving Forward

The environmental challenges found in AOCs can be overcome. But meeting them will require the continued efforts of COA agencies and, more importantly, a partnership among all levels of government, industry and citizens alike.

For More Information

http://www.on.ec.gc.ca/water/raps/intro_e.html (english)



Annex 2

HARMFUL POLLUTANTS

Overview

Through the COA, the Governments of Canada and Ontario are working towards the virtual elimination of persistent bioaccumulative toxic substances and the significant reduction of other harmful pollutants. "Bioaccumulative" refers to substances that build up in the food chain over time.

Under the agreement, Canada and Ontario have established three five-year goals for dealing with pollutants that seriously affect the health or functioning of the Great Lakes Basin ecosystem. The governments have made 69 commitments in support of these goals, which are being fulfilled through 192 agency projects. Approximately 25% of these projects were complete by the end of 2005 and most of the rest are expected to be completed within the COA timeframe.

Purpose of Annex

Through this Annex, Canada and Ontario continue their commitment to protect human health and the environment from harmful pollutants. The Annex defines harmful pollutants as the substances on its Tier 1 and Tier 2 lists, plus common air pollutants known as "Criteria Air Pollutants."

Persistent bioaccumulative toxic substances are of grave concern as they can threaten fish, wildlife and human health. They may remain in water or sediment for years and cause impairment to aquatic organisms. Substances of this type have been transferred through the food chain, making it necessary to issue advisories about fish consumption across the Great Lakes.

The Tier 1 list includes 13 persistent bioaccumulative toxic substances such as PCBs, mercury, dioxins and furans.

Tier 2 substances have the potential for causing widespread impacts or have already caused local adverse impacts on the Great Lakes environment. Examples include cadmium, tributyl tin and a group of 17 polycyclic aromatic hydrocarbons (PAHs).

Criteria Air Pollutants are linked to air quality issues like smog and acid rain. They include nitrogen oxides, volatile organic compounds, sulphur dioxide and some types of particulate matter. These substances are released to the environment from various sources, including the burning of fossil fuels.

The Annex targets virtual elimination of all Tier 1 substances. This means that there will be no measurable release of them to the environment. The Annex calls for efforts to achieve significant reductions in the Tier 2 substances and the Criteria Air Pollutants.

Progress on Goals

Goal 1

Put policies and programs in place to make progress on the virtual elimination of persistent bioaccumulative toxic substances such as mercury, dioxins, furans and PCBs.

Progress

Ongoing agency programs, supported by commitments under the COA and the Great Lakes Binational Toxics Strategy, have resulted in significant reductions in the release of persistent bioaccumulative toxic substances. Compared with the base year 1988, high-level PCBs have been reduced by 89%, mercury by 84% and dioxins and furans by 87%. Estimates of these reductions will change over time as inventories are updated.

Goal 2

Reduce other harmful pollutants that have a significant environmental impact.

Progress

Federal and provincial regulatory and non-regulatory initiatives are reducing the use, generation and release of other harmful pollutants. Examples of reductions from 1988 levels include: 45% for benzo(a)pyrene; 68% for hexachlorobenzene; and the virtual elimination of alkyl-lead, octachlorostyrene and five pesticides – aldrin/dieldrin, chlordane,

dichlorodiphenyltrichloroethane (DDT), mirex and toxaphene.

Have comprehensive knowledge of the sources, movement, fate and impact of harmful pollutants, including persistent bioaccumulative toxic substances, for policy and program development purposes.

Goal 3

Progress

Many projects by COA agencies focus on monitoring and assessing the impact of pollutants, as well as developing analytical methods for these purposes. These projects are supported by ongoing COA agency programs that have increased our understanding of priority substances and emerging chemicals of concern. A summary of many of these projects will be compiled by March 2007 as a report on COA activities that contribute to the knowledge of harmful pollutants.

In addition, during 2005 Canada and Ontario made plans for a staff workshop on emerging substances. Scheduled for Toronto in March 2006, the workshop was to feature speakers from the U.S. Environmental Protection Agency (EPA), non-governmental organizations, the academic world and industry. Objectives were to highlight current COA strategies that will work for emerging substances and make recommendations for coordinated federal-provincial research and regulations on these chemicals of concern.

COA IN ACTION

Reducing Harmful Pollution Caused from Wood Burning

Burn-it-Smart is a campaign to educate Canadians who heat with wood or burn wood for recreational purposes. It helps users make their wood-burning practices safer, cleaner and more efficient. In 2004 and 2005, more than 2,500 people attended 40 community workshops. In addition, brochures on Wood Burning in the City and Good Firewood were posted on the Burn-it-Smart website (<http://www.burnitsmart.org>). Videos on Advanced Technology (EPA-certified) Woodstoves, Firewood from the Forest to the Shed and Woodstove Operation have also been produced and will soon be accessible through the website.

Tracking Sources of Pollution

Great Lakes beaches are often posted with warnings to swimmers about the potential health risk of exposure to bacteria or other pathogens in the water. New methods to track sources of bacterial pollutants are being developed to help identify and remediate the causes of beach contamination. For example, studies of *E. coli* in Hamilton Harbour have determined that much of the bacteria found on local beaches can be traced to birds, such as gulls and geese, which congregate on the sand and nearby grassy areas. These new tracking methods based on DNA promise to allow better targeting of efforts to improve water quality at beaches.

A number of studies have been completed on endocrine disrupting compounds (e.g., estrogen) in municipal wastewater as well as on toxic emerging substances in municipal wastewater, sludge samples and industrial wastewater. Information on contaminants found in sewage and sludge samples has been incorporated into a database that will be used to develop future guidelines on wastewater quality.

Developing Technology To Measure Fugitive Pollution Emissions

Fugitive emissions are those that escape from facilities despite pollution controls. COA agencies sponsored a Canadian field survey in Alberta to advance the DIAL system, a state-of-the-art analytical tool that takes real-time measurements of fugitive emissions. In the past, these emissions were estimated based on engineering principles. DIAL stands for Differential Absorption LIDAR (Light Detection and Ranging). It is a laser-based system that can locate "hot spots" around a facility by mapping the emissions of specific organic compounds in real time. COA agencies are now planning to use this tool in the Great Lakes Basin to get a better understanding of fugitive emissions around Ontario communities.

Municipal Actions to Reduce Mercury

Despite its toxic nature, mercury is still contained in a wide range of products that are

commercially available and used in homes and buildings in Canada. These products include thermostats, thermometers, fluorescent lamps, pressure-measuring devices, electrical switches and relays and dental amalgam.

The COA agencies produced and promoted a manual to help municipalities manage mercury-containing products found in municipal buildings and street lighting. This document provides guidance on how to develop a Municipal Mercury Elimination Policy and Plan and is available at <http://www.ec.gc.ca/MERCURY/MM/municipalActions/EN/main.cfm>.

Reducing Pollution from Household Waste Burning

The burning of household garbage is expected to become the leading source of dioxin emissions once standards for industrial air emissions are in place. In rural areas in particular, garbage is often burned in open barrels.

Two workshops on ways to reduce burning were delivered to local officials in the Lake Superior region in March 2005 – one in Duluth, Minnesota sponsored by the U.S. EPA Great Lakes National Program Office and the other in Thunder Bay sponsored by Environment Canada. A website for information on household waste burning is available at www.openburning.org.

Measuring the Effectiveness of Our Efforts

Sediment quality is a key indicator of Great Lakes ecosystem health. In 2004-2005, COA agencies carried out the Great Lakes Sediment Assessment Program to measure the distribution of toxics in sediments and determine what happens to them.

This program provides valuable information for tracking progress towards virtual elimination of longstanding pollutants like PCBs and DDT. It also determines whether industrial chemicals and pesticides in current use are present in sediment. The results of this program show that binational management actions have been highly effective in reducing toxic discharges. Concentrations of many of these compounds now compare favourably with the most stringent guidelines for the protection of ecosystem health.

ANNEX CHALLENGE

Great strides have been made in reducing the release of several persistent toxic substances – dioxins and furans in particular – in the Great Lakes Basin. Remaining dioxin and furan emissions pose a challenge since they are widely dispersed among small sources such as the burning of household waste. The relative importance of these dispersed sources must be assessed to plan further action.

Some substances of emerging concern are under investigation by the federal and/or provincial governments through the COA. Studies are underway to develop analytical methods, monitor the sources of these substances and their presence in the environment and assess their effects. The results will enhance our understanding and support future efforts to protect human and environmental health.

Moving Forward

Continued reductions in the release of Tier 1 and Tier 2 substances have been observed over the two years covered by this report. Reductions in mercury, PCBs, dioxins and furans have met at least 97% of the targets in the agreement and will be further assessed when the next update to the emissions inventories is completed. Decreases have also been observed for other persistent toxic substances and this trend is expected to continue in 2006. Federal and provincial agencies will keep up their efforts to find and track reductions in harmful pollutants in the Great Lakes basin for the duration of the COA, in collaboration with stakeholders.

For More Information

<http://www.binational.net> <http://www.on.ec.gc.ca/coa/intro.html>



Annex 3

LAKEWIDE MANAGEMENT

Overview

Lakewide management is an ecosystem approach to protecting the Great Lakes. Although the lakes are connected, they differ physically, biologically, chemically and geographically and must be managed individually.

Federal, state and provincial agencies in the U.S. and Canada are working cooperatively to plan for the protection, restoration and monitoring of the ecosystem health of each of the lakes. The vehicles for this co-operation are the Lakewide Management Plans (LaMPS) for Lakes Ontario, Erie and Superior and the Binational Partnership programs for Lake Huron and Lake St. Clair.

Purpose of Annex

This Annex focuses on effectively managing the lakes through consensus building, collaborative decision-making and shared implementation of action. The objective is to address lake-specific ecological and human use impairments.

Progress on Goals

Goal 1

Clearly understanding the environmental problems and causes of ecological impairment.

Progress

To achieve this goal, COA agencies and their U.S. partners publish biennial reports documenting their understanding of environmental problems and causes of ecological impairment in each of the Canadian Great Lakes and Lake St. Clair. In 2004, Binational LaMP updates were completed for Lakes Superior, Erie and Ontario, describing the state of each lake, the causes of impairment and the actions required to restore environmental quality. The next set of LaMP updates was scheduled for spring 2006.

The Lake Huron Binational Partnership was formed in 2002 and the first binational action plan for Lake Huron was completed in spring 2004. During the 2004-2005 period, an assessment of environmental conditions was also undertaken for Lake St. Clair.

Overall findings reveal that the Great Lakes ecosystem is being challenged by intensification and expansion of both urban and rural land use, the introduction of non-native invasive species, inputs of persistent toxic chemicals and nutrients, and a changing climate. Comprehensive management actions are required to maintain past successes and prevent further degradation.

Projects under the COA have played a significant role in implementing actions called for in the LaMPs and have improved our understanding of the causes of ecological impairment.

The most recent information on the state of Lakes Superior, Huron, Erie and Ontario is available at http://binational.net/home_e.html.

Reaching consensus on, and having broad-based support for, direction and priority actions for environmental restoration, protection and conservation.

Goal 2**Progress**

To achieve this goal, COA agencies are leading the development and implementation of comprehensive workplans to restore and protect each of the Great Lakes – plans that involve multiple governments and multiple partners.

In 2004 and 2005, COA agencies worked with partners to establish priorities and undertake projects to reduce sources of pollutants, restore fish and wildlife habitat and improve water quality and ecosystem health. The agencies fostered a broad-based consensus through consultation, partner engagement and public outreach. These programs continue to build community support for priority actions to address the causes of impairment.

Making progress on habitat restoration, conservation and protection and reducing the impact of harmful pollutants with a lake-by-lake focus.

Goal 3**Progress**

The 2004 biennial LaMP updates summarize the progress made toward habitat restoration, conservation and protection. For example, 98 projects to secure and restore more than 9,700 hectares of waterfowl habitat in the Great Lakes Basin were completed through a partnership involving the Ontario Ministries of Agriculture, Food and Rural Affairs and Natural Resources, Environment Canada and the Eastern Habitat Joint Venture. (For information on the Eastern Habitat Joint Venture, see <http://www.on.ec.gc.ca/wildlife/ehjv/oejhv-e.html>.)

Lake restoration is a slow process, since net gains from the reduction of harmful pollutants, restoration of fish and wildlife habitats, and programs to reduce disruption by invasive species may not be apparent for several years. Strong long-term commitments are required to further such key priorities as: reducing the impact of invasive species, restoring natural habitats, the remediation of contaminated sediment, the study of emerging chemicals and the monitoring and assessment of ecological indicators.



COA IN ACTION

Cooperative Studies and Action

Cooperative binational monitoring projects were undertaken for Lakes Erie and Superior during 2004 and 2005. These multi-agency initiatives go beyond the regular monitoring programs conducted by government and non-government researchers. They promote efficient use of resources, data sharing and consistency, while filling major information gaps.

The successful Lake Ontario LaMP program for monitoring the lower food chain (the Lower Trophic Foodweb Monitoring Program) provided a model for the Lake Erie and Lake Superior projects. These new studies – involving U.S. federal and state governments, the Canadian and Ontario governments and universities on both sides of the border – are increasing our understanding of such issues as invasive species, nutrient dynamics, climate change and the impact of contaminants.

The Lake Erie Collaborative Comprehensive Survey in 2004 involved a study of the impact of low water levels, severe weather events and invasive species on key physical processes and water quality in the lake. Preliminary results indicate significant changes in the distribution of zebra and quagga mussels in Lake Erie, with the quagga mussel now dominant and reaching maximum densities in the east basin. Coupled with the results of the studies on water movements, these changes in distribution patterns will update our understanding of the links between physical and biological processes in the lake and how they affect the food web and the dynamics of nutrients and contaminants.

The Lake Superior collaborative monitoring project brought together water quality and food web experts from both sides of the border in 2005 to plan coordinated monitoring for the largest of the Great Lakes. Results from this initiative are not yet available.

Other cooperative projects and approaches included:

Lake Erie Binational Public Forum

In 2005, the Lake Erie LaMP watershed project concluded under the sponsorship of the Lake Erie Binational Forum. In co-operation with partners from Kettle Creek in Ontario and Black River in Ohio, the binational forum worked to create community-based watershed strategies and build local capacity for ongoing stewardship of the ecosystem. These community watershed strategies prioritized local environmental concerns, identified activities to address them and built local frameworks for ongoing projects. The forum includes representation from farmers associations, academics, industry, Remedial Action Plans (RAP), businesses, municipalities and public health sectors throughout the Lake Erie basin in Canada and the U.S.

Lake St. Clair Canadian Watershed Management Plan Technical Report

Released in 2005, the Lake St. Clair Canadian Watershed Management Plan Technical Report represents a consensus of the Canadian Watershed Co-ordinating Council on current ecosystem conditions in the Canadian portion of the watershed. A consultation process was held during the year to obtain feedback on watershed management recommendations.

Great Lakes Public Health Network

The COA agencies established the Great Lakes Public Health Network to exchange information on health matters by working through the existing RAP and LaMP processes. Members are volunteer representatives from various levels of government and other agencies, including Ontario public health units. In turn, these representatives communicate with their stakeholders. The network discusses the potential risks to human health and other concerns that may arise from environmental issues such as contaminants in fish and exposure to pesticides.

Conserving Fish and Wildlife Habitat

Conserving habitat is a key to a healthy Great Lakes Basin ecosystem. COA agencies continued to work hard on this priority.

In 2004 and 2005, restoring habitats for fish and wildlife and improving local water quality were the combined goals of Lake Huron's Tributary Rehabilitation Project. More than 100 partners –

including private landowners, municipalities, conservation authorities, stewardship council networks, farm organizations and outdoor groups – came together in an effort to protect dozens of rivers and streams throughout the Lake Huron basin.

Locally, the groups employed a variety of techniques, including:

- restricting livestock access to watercourses;
- removing dams to restore natural stream and river flow patterns;
- working with farmers to reduce sediment and nutrient runoff;
- re-creating fish spawning habitat; and
- replanting degraded stream and riverside banks with native grasses, trees and shrubs.

While the project encouraged care and stewardship of rural lands throughout the Lake Huron basin, the focus was on the Ausable, Bayfield, Maitland and Saugeen Rivers and their main tributaries, and the watercourses of Simcoe County and Manitoulin Island.

Natural Heritage Protection

COA funds helped to enhance the information content on rare species biodiversity in the Natural Heritage Information Centre's (NHIC) biotics database. These improvements have increased our knowledge about the occurrence of rare aquatic species (e.g., molluscs) in the Great Lakes Basin. The NHIC has also made it easier for partners to access this data.

As well, the NHIC is working with the Nature Conservancy of Canada to develop a database, classification system and conservation action plan for Ontario's biologically diverse Great Lakes islands. This initiative is being integrated with similar work on the U.S. side to form a binational plan.

Canada-U.S. efforts to conserve biologically diverse islands received further support with the creation of the Great Lakes Protected Areas Network, which has compiled a registry of protected areas throughout the basin.

COA funds were used to purchase 912 hectares of globally rare coastal habitat, called alvar, on Strawberry Island in the North Channel of Georgian Bay. In addition, the national Ecological Gifts Program led to protection of more than 1,200 hectares of habitat, part of the total of 8,108 hectares protected in Ontario since 1995.

Conserving Bald Eagle Habitat

One of the priorities in the Lake Ontario LaMP is to establish and conserve bald eagle nesting areas, both inland and on the shoreline. The aim is a self-sustaining population of these magnificent birds throughout the lake and upper St. Lawrence River. In spring 2005, selected young eagles were fitted with radio transmitters so that their movements could be monitored by satellite to pinpoint areas with healthy eagle populations and identify suitable areas for enhanced habitat. The results of this study will contribute to developing a strategy for managing bald eagle habitat on Lake Ontario and also on Lake Erie.

Managing Ballast Water to Control Invasive Species

Aquatic invasive species have threatened the Great Lakes since Europeans settled in the region. In the 1830s, the sea lamprey – an eel-like fish native to the coastal regions of the Atlantic Ocean – entered the Great Lakes through man-made canal systems. Since the opening of the St. Lawrence Seaway in 1959, scientific evidence suggests that ships are likely responsible for more than 70% of introductions of aquatic invasive species into the Great Lakes. Strong measures are in place to prevent further introduction of such organisms as zebra mussels, ruffe and round gobies, which have caused significant ecological damage and financial losses.

In 2005, the Ballast Water Control and Management Regulations were published in the Canada Gazette for public comment. (The final version took effect in June 2006.) The regulations are harmonized with U.S. rules and require ships to exchange their ballast before entering Canadian waters.

However, most ships entering the Great Lakes are fully loaded with cargo and have only residual

unpumpable ballast in their tanks. In this case, the regulations require flushing the residual ballast with saltwater to produce a salinity level that will inactivate most fresh water organisms. The regulations also include the latest requirements of the 2004 International Ballast Water Convention. Research is continuing to develop shipboard technologies for treating ballast water.

THE ANNEX CHALLENGE

The ecosystems in the Great Lakes Basin are undergoing rapid and permanent changes because of the effects of non-native invasive species, continued urbanization, the intensification of agriculture, the aging of infrastructure and the influx of nutrients and toxic substances. Rapid urbanization – and the resulting habitat loss, erosion, degraded water quality and need to replace sewer treatment systems – is a particular concern in the lower Great Lakes. These changes are causing detrimental impacts to the ecosystems themselves as well as adversely affecting human uses.

The challenges to the Great Lakes ecosystem cover issues which are under the jurisdiction of a number of federal, provincial and municipal agencies. These agencies are responsible for fish and wildlife management, pollution control and regulation, land-use planning, funding of infrastructure and transportation. To achieve positive, cost-effective results, lakewide management actions must be undertaken on an ongoing basis, as well as in a coordinated, flexible manner across agencies and disciplines. Co-ordination on this scale is challenging and involves partners that have not traditionally been engaged in lakewide management roles. COA agencies will continue to build upon and improve efforts to coordinate and harmonize the actions of all agencies that play a role in improving the basin's ecosystem.

It is essential to continue to fund and support scientific and monitoring activities, such as the collaborative monitoring initiatives noted above, to produce timely information and knowledge as a basis for management decisions.

Moving Forward

Lakewide management is a long-term effort and requires an equally long-term commitment. Invasive species, chemical contamination, rapid urbanization and aging infrastructure pose significant challenges. These development pressures and other complex changes make cooperative action, shared research and full and open communications more important than ever.

For More Information

<http://www.on.ec.gc.ca/greatlakes/default.asp?lang=En&n=324C092F-1> (English)



Annex 4

MONITORING & INFORMATION MANAGEMENT

Overview

The COA partners rely on monitoring and information sharing to track environmental changes in the Great Lakes Basin and measure progress toward COA goals. Monitoring is essential to both detect emerging issues and identify historic issues that require COA action. It also enables COA partners to make science-based decisions for the benefit of the basin ecosystem.

Purpose of Annex

This Annex coordinates monitoring programs as part of the implementation of Lakewide Management Plans (LaMPs) and Remedial Action Plans (RAPs). The Annex gives COA partners access to federal and provincial Great Lakes databases and ensures compatibility among different information management systems and databases.

Monitoring programs serve a number of purposes. They are designed to:

- determine long-term changes in environmental quality and ecosystem composition;
- measure concentrations of contaminants, industrial emissions and toxic discharges; and
- assess the impact of restoration activities.

COA partners need ready access to all information collected through monitoring in order to meet their obligations and shared responsibilities under the agreement. The use of new web-based technologies enables the broad dissemination of monitoring data and thereby contributes to informed decision-making.

Progress on Goals

Goal 1

Coordinated and efficient federal/provincial scientific monitoring.

Progress

COA agencies furthered this goal through the Binational Monitoring Inventory, the Cooperative Monitoring Initiative and the Areas of Concern (AOC) Monitoring Matrix.

A highlight was the launch of the Binational Monitoring Inventory on the Internet at www.binational.net. (See next section for details.)

Lake Erie was the focus of the Cooperative Monitoring Initiative for the 2004 field season. Monitoring activities revolved around changes to the ecosystem since the invasion of the zebra mussel, such as mussel distribution and density and shifts in lake physics and nutrient content.

The AOC Monitoring Matrix was developed during the 2004-2005 period. It illustrates the status of beneficial use impairments in each AOC and serves as an information tool for discussions on monitoring priorities.

Goal 2

An information management system for tracking environmental change and progress.

Progress

To achieve this goal, by 2007 COA agencies aim to develop and implement Lakeviews – a web-based mapping application that will provide user-friendly access to data on environmental change and progress. The focus will be on the State of the Lakes Ecosystem Conference (SOLEC) and LaMP indicators. (SOLEC is hosted every two years by the U.S. Environmental Protection Agency (EPA) and Environment Canada in response to reporting requirements in the binational Great Lakes Water Quality Agreement.)

Initially, Lakeviews will include federal and provincial Great Lakes information. This will be the starting point for integrating additional data from LaMPs, AOCs, conservation authorities, municipalities and other interest groups. The objective is to enable seamless integration of

environmental information gathered throughout the basin.

In 2004 and 2005, progress was made in designing the customizable web-mapping architecture and building support for the intended approach, i.e., environmental progress reporting based on SOLEC and LaMP indicators.



COA IN ACTION

Workshop Promotes Coordinated Monitoring

To date, monitoring activities in AOCs have focused on assessing beneficial use impairments (BUIs), identifying stressors, guiding remedial actions and reaching the delisting targets. In September 2004, an AOC Monitoring Workshop for federal and provincial government representatives was held on water quality, sediment quality and biomonitoring as it relates to BUIs. The workshop resulted in technical advice to support decision-making on delisting and to help identify data requirements and survey design principles for the creation of monitoring plans for each AOC.

Binational Inventory of Great Lakes Monitoring Programs

In the past, it was difficult to determine what monitoring programs were underway in a particular lake or AOC because of the wide number of agencies and organizations involved. As a result, co-ordinating monitoring efforts was a cumbersome exercise.

In 2004, the Great Lakes Binational Monitoring Inventory was established online at binational.net. COA agencies and their U.S. partners together developed this publicly accessible tool for collecting and sharing information on Great Lakes monitoring programs. The inventory also facilitates discussions at LaMP and RAP meetings on monitoring activities and gaps.

Tracking Status of Impairments in Areas of Concern

As more actions are completed to restore AOCs, there is an increasing demand for monitoring to demonstrate that these actions are actually eliminating the impairments. In 2005, COA agencies worked together to establish an up-to-date and consistent process for tracking impairments, as well as to identify future monitoring requirements.

Cooperative Monitoring Initiative for LaMPs

This initiative aims to strengthen binational co-ordination of Great Lakes monitoring, in order to increase awareness, optimize programs, improve reporting and realize efficiencies.

Greater awareness

One of the main benefits of this initiative is that individuals involved in a monitoring theme can now share sampling and analytical technologies and information on their research. Through the LaMP working groups, all agencies represented are informed of monitoring activities undertaken through this process on the lakes for which they are responsible.

Optimize programs

The Cooperative Monitoring projects are designed by a core group of experts and the work is jointly planned, scheduled and executed. New technologies, such as optical plankton counters, are tested and validated. The result is optimization of both project design and implementation.

Improve reporting

Comparative studies of the various data sets help determine which ones can be merged and which ones can't – a common issue in joint reporting. Data-sharing sites have been established on the Internet to facilitate the exchange of information and binational workshops are held to discuss and report on Cooperative Monitoring activities.

Realize efficiencies

Efficiencies have been achieved by piggybacking monitoring efforts on lake cruises and other surveys. For example, Environment Canada collected samples for the U.S. Great Lakes National Program Office on a Lake Erie cruise, cutting vessel and staff costs for the EPA. As well, sample extracts are often shared, allowing multiple chemical analyses from a single sample.

Regional Environmental Information Systems

The University of Windsor's Windsor-Essex Environmental Metadata System (WEEMS), funded by the Ontario Ministry of the Environment, links and organizes information in nearly 500 environmental and biological datasets within the Windsor-Essex Region. A catalogue system based on a standardized data format, WEEMS enables users to search and discover information originating from local conservation authorities, municipalities and various research initiatives. Through partnerships with other regional organizations, WEEMS also supports retrieval of environmental and biological datasets within the Great Lakes Basin.

COA has assisted York University, in partnership with the Toronto and Region Conservation Authority, to build a compatible information system that will further promote access to local water quality monitoring and environmental indicator data.

THE ANNEX CHALLENGE

A key challenge is to build the capacity within COA agencies to publish information through emerging Internet-based technologies, such as web services and geospatial mapping, that link environmental data holdings in different locations. The use of new technologies is the only sustainable way to meet expectations for access to the environmental information needed by the COA community. Deploying these web services will require information management and technical support at the primary source of the information – meeting the COA principle that data stays at its source.

Moving Forward

COA partners continue to expand the Great Lakes Binational Monitoring Inventory to include additional monitoring programs. Development of web services to deliver environmental change and progress information through the Internet is also a priority. The Lakeviews mapping application will add "views" for the Great Lakes Binational Toxics Strategy, SOLEC, LaMPs and RAPs – using the monitoring indicators or delisting criteria as the focus for reporting environmental progress to the public through the Internet.

For More Information

Great Lakes Monitoring Exchange (Binational Executive Committee Monitoring Inventory):
<http://binational.on.ec.gc.ca/bec/intro-e.cfm> (English)

Appendix

Progress on attaining the goals of the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem is possible only through the cooperation of many partners in the governments of both Canada and Ontario. For more information on these COA agencies, please visit their websites.

Government of Canada

Agriculture and Agri-Food Canada (AAFC)

www.agr.gc.ca

Environment Canada (EC)

www.ec.gc.ca

Fisheries and Oceans Canada (DFO)

www.dfo-mpo.gc.ca

Health Canada

www.hc-sc.gc.ca

Parks Canada

www.pc.gc.ca

Natural Resources Canada (NRCan)

www.nrcan.gc.ca

Public Works and Government Services Canada (PWGSC)

www.pwgsc.gc.ca

Transport Canada

www.tc.gc.ca

Government of Ontario

Ontario Ministry of the Environment (MOE)

www.ene.gov.on.ca

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

www.omafra.gov.on.ca

Ontario Ministry of Natural Resources (MNR)

www.mnr.gov.on.ca

This report is available on the Environment Canada website at **www.on.ec.gc.ca/coa** and on the Ministry of Environment website at **www.ontario.ca/environment**



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